



# Industrial Digital Print

## State of the Market January 2019

### *Industrial Digital Print*

As we begin 2019 ITS offers below a concise update, commentary and statistical analysis of industrial print markets. That is to say digital print output markets beyond the office, but not including commercial/communications print, or labels and packaging.

### **The Sectorization of Industrial Print Markets**

These are the sectors we include under industrial. The three largest digital sectors (in italics) are ceramic tiles, display graphics and textiles, which account for 80% of digital revenues.

- Industrial 3+ axis Direct To Shape
- Industrial 3D Marking – Deep platen 2D systems for marking of mfd. goods
- Industrial 3D Printing – 3D manufacturing using Inkjet
- Industrial Decorative Floors (not including ceramic tiles)
- Industrial Decorative Glass
- Industrial Decorative Architectural Surfaces (Decorative Laminates)
- Industrial Printed Electronics
- *Textiles – including apparel, home furnishings, soft signage*
- *Industrial Display Graphics – including all digital wide format graphics*
- *Industrial Ceramic Tiles*
- Industrial Wood
- Industrial Wallcoverings

The total revenues for digital print at vendor level (hardware and consumables) are \$8.2B in 2018. The retail equivalent of the value of this digital print sold to retailers would correspond to \$70B at a rough average multiplication factor of nine. Against that retail revenues for analog printed product markets within the same sectors are

around \$518B. That gives digital a 13.5% share of all analog measured by assumed retail revenues for printed items.

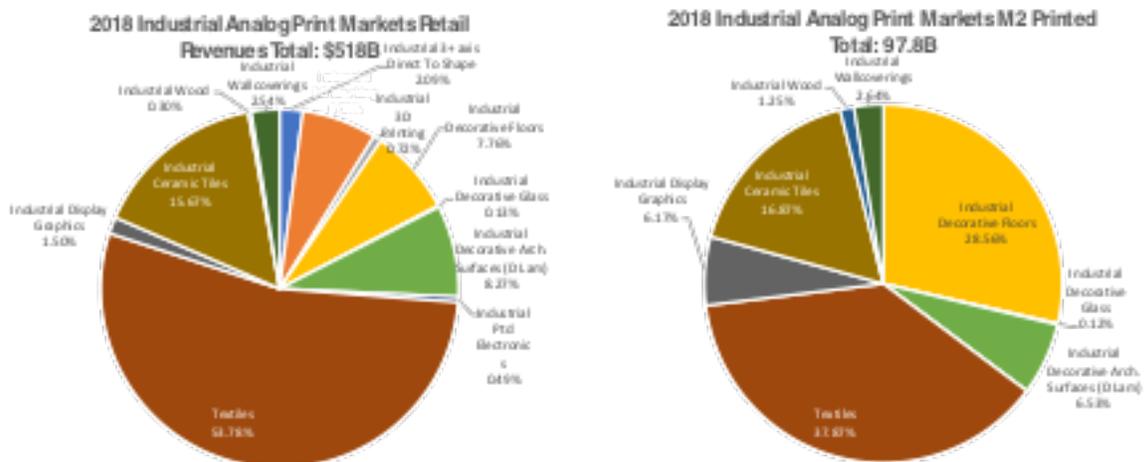
We estimate that about 1/3 of analog industrial markets ultimately have some kind of eligibility to be digital. That 1/3 is measured by square meters printed. But this comparison does not include 3+Axis 3D printing, 3D marking or 3D inkjet manufacturing or printed electronics, as these markets are not capable of measurement by square meters of area of print. Where the measurement is possible in the other sectors digital has a share of about 9.7% of all analog print, or under 1/3 of what we call the available market. These numbers are heavily weighted by the dominant markets of display graphics, ceramic tiles and textiles. Measuring markets against eligibility of existing analog markets under-sizes the long-term potential market however, since it is likely that up to half or more of ultimate digital markets will be unique markets not previously served by analog, according to the last twenty years of digital market development beyond the office.

Digital has a wide variety of formats within the industrial markets, which can be summarized as follows:

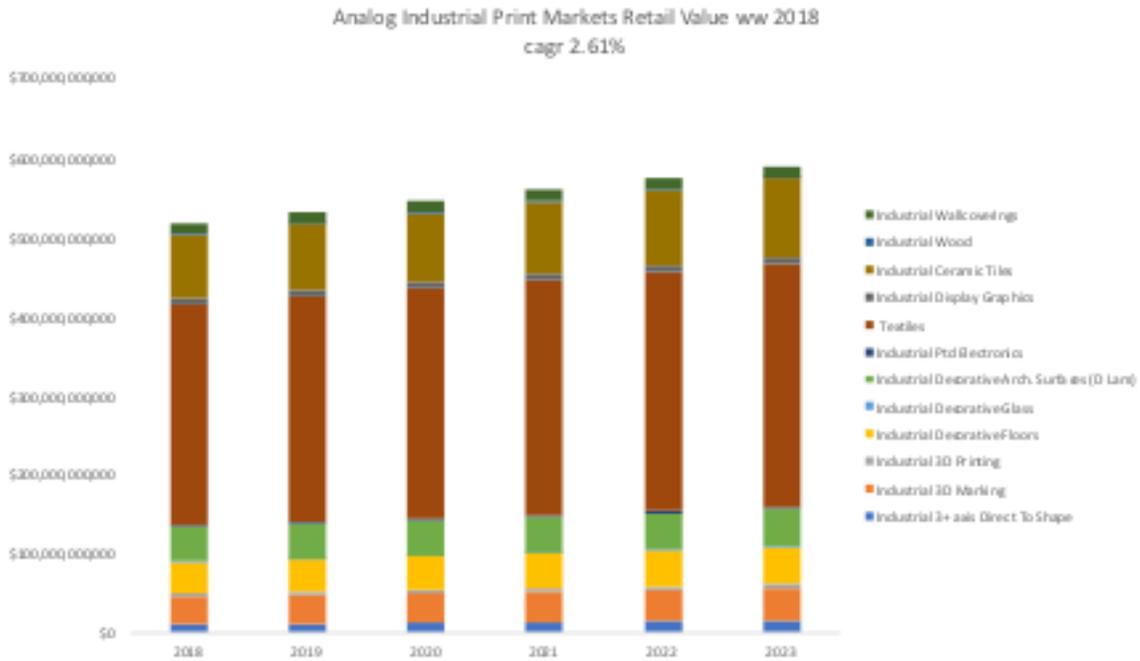
| Sector                    | Digital Formats   | Technology    |
|---------------------------|---|---------------|
| 3+ axis Direct To Shape   | Md-/Large-scale standalone presses                      | UVI           |
| 3D Marking                | small-scale deep platen UVI systems                     | UVI           |
| 3D Printing               | small/Md-scale sandbed & UV forming systems             | UV/So/VAQ IJ  |
| Decorative Floors         | Specialist FB systems UVI                               | UVI/AQIJ      |
| Decorative Glass          | Specialist Frit Ceramic pigment IJ                      | Sol IJ/UVI    |
| Decorative Arch. Surfaces | UV and AQ IJ FB Systems                                 | UVI/AQIJ/LXIJ |
| Ptd Electronics           | Usually Pattern-assisted IJ                             | Sol IJ/Spec.  |
| Textiles                  | R2R Dye sub small-scale and Reactive dye large-scale IJ | AQIJ          |
| Display Graphics          | AQ, ES, LX and UV R2R and FB systems mostly serial      | AQIJ/UVI/LXIJ |
| Ceramic Tiles             | Ceramic pigment oil IJ CF FB                            | Sol IJ        |
| Wood                      | UV and AQ IJ FB Systems                                 | UVI/AQIJ      |
| Wallcoverings             | R2R LX and other IJ systems, some EP                    | AQIJ/UVI/LXIJ |

### Size of Analog Industrial Printed Market by Sector

In the following statistics we represent the size of the market for analog-printed industrial goods at the retail price level for sales of printed items to final users and also in terms of area output in square meters. All numbers are global for 2018. We omit square meter numbers for 3+Axis 3D printing, 3D marking, 3D inkjet manufacturing and printed electronics, as these markets are not capable of measurement by square meters of area of print.



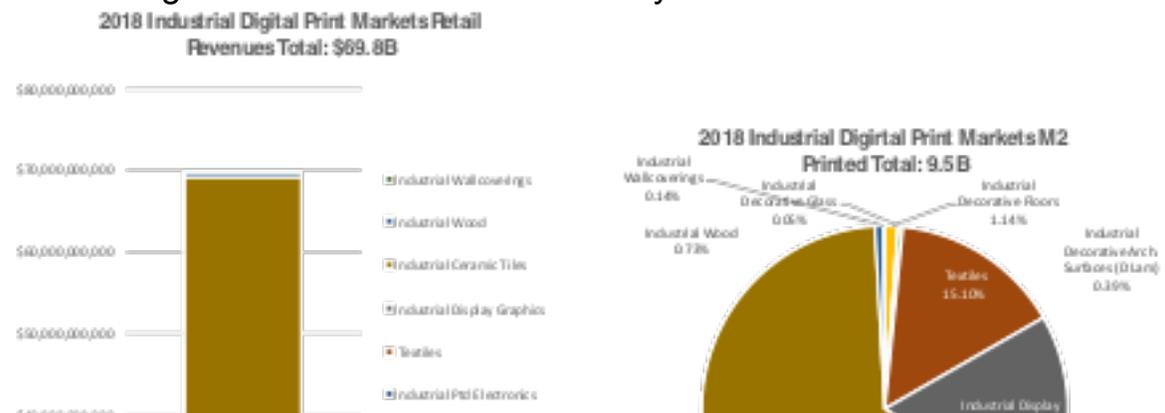
This is a projection of the growth of these analog markets over five years in terms of retail revenue.

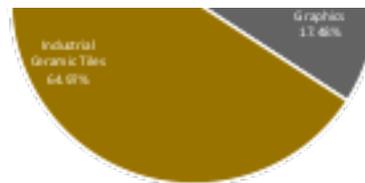
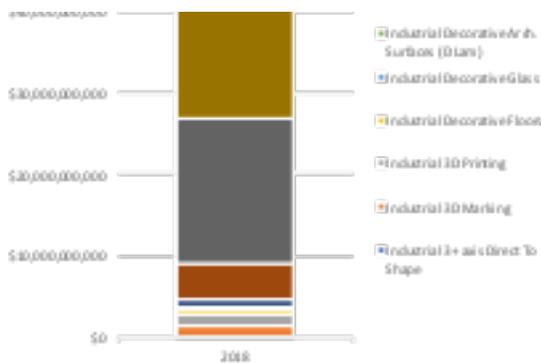


These are the sectoral annual projections for retail revenue of analog industrial printed goods together with the growth rates we have assumed based on research for each sector:

| Industrial Print Markets Analog Retail Revenues |                          |                          |                          |                          |                          |                          |              |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------|
|   | 2018                     | 2019                     | 2020                     | 2021                     | 2022                     | 2023                     | cagr         |
| Industrial 3+ axis Direct To Shape              | \$10,800,000,000         | \$11,664,000,000         | \$12,507,120,000         | \$13,604,889,600         | \$14,403,280,768         | \$15,868,748,229         | 8.00%        |
| Industrial 3D Marking                           | \$35,020,000,000         | \$36,070,600,000         | \$37,152,718,000         | \$38,267,299,540         | \$39,415,318,526         | \$40,597,736,062         | 3.00%        |
| Industrial 3D Printing                          | \$3,710,000,000          | \$3,932,600,000          | \$4,168,956,000          | \$4,418,669,360          | \$4,681,789,522          | \$4,964,816,893          | 6.00%        |
| Industrial Decorative Rooms                     | \$40,170,000,000         | \$41,375,100,000         | \$42,636,263,000         | \$43,954,843,590         | \$45,331,688,898         | \$46,768,030,365         | 3.00%        |
| Industrial Decorative Glass                     | \$669,500,000            | \$689,585,000            | \$710,272,550            | \$731,580,727            | \$753,528,148            | \$776,128,063            | 3.00%        |
| Industrial Decorative Arch. Surfaces (D Lam)    | \$42,840,000,000         | \$43,696,800,000         | \$44,570,716,000         | \$45,462,150,720         | \$46,371,303,734         | \$47,298,821,009         | 2.00%        |
| Industrial Ptd Electronics                      | \$2,525,000,000          | \$2,550,250,000          | \$2,576,252,500          | \$2,601,510,025          | \$2,627,525,125          | \$2,653,800,377          | 1.00%        |
| Industrial Textiles                             | \$278,460,000,000        | \$284,029,200,000        | \$289,700,284,000        | \$295,503,979,680        | \$301,440,059,274        | \$307,442,240,459        | 2.00%        |
| Industrial Display Graphics                     | \$7,764,790,000          | \$7,920,045,000          | \$8,078,465,000          | \$8,240,014,828          | \$8,404,815,114          | \$8,572,911,417          | 2.00%        |
| Industrial Ceramic Tiles                        | \$81,120,000,000         | \$84,364,800,000         | \$87,730,302,000         | \$91,248,967,680         | \$94,898,026,387         | \$98,604,888,463         | 4.00%        |
| Industrial Wood                                 | \$1,530,000,000          | \$1,560,600,000          | \$1,591,812,000          | \$1,623,648,240          | \$1,656,121,205          | \$1,689,248,629          | 2.00%        |
| Industrial Wallcoverings                        | \$13,130,000,000         | \$13,261,300,000         | \$13,398,913,000         | \$13,527,852,130         | \$13,663,130,651         | \$13,799,701,068         | 1.00%        |
| <b>Total</b>                                    | <b>\$517,739,290,000</b> | <b>\$521,114,880,000</b> | <b>\$524,908,854,950</b> | <b>\$529,125,406,130</b> | <b>\$533,793,577,353</b> | <b>\$538,927,238,062</b> | <b>2.61%</b> |

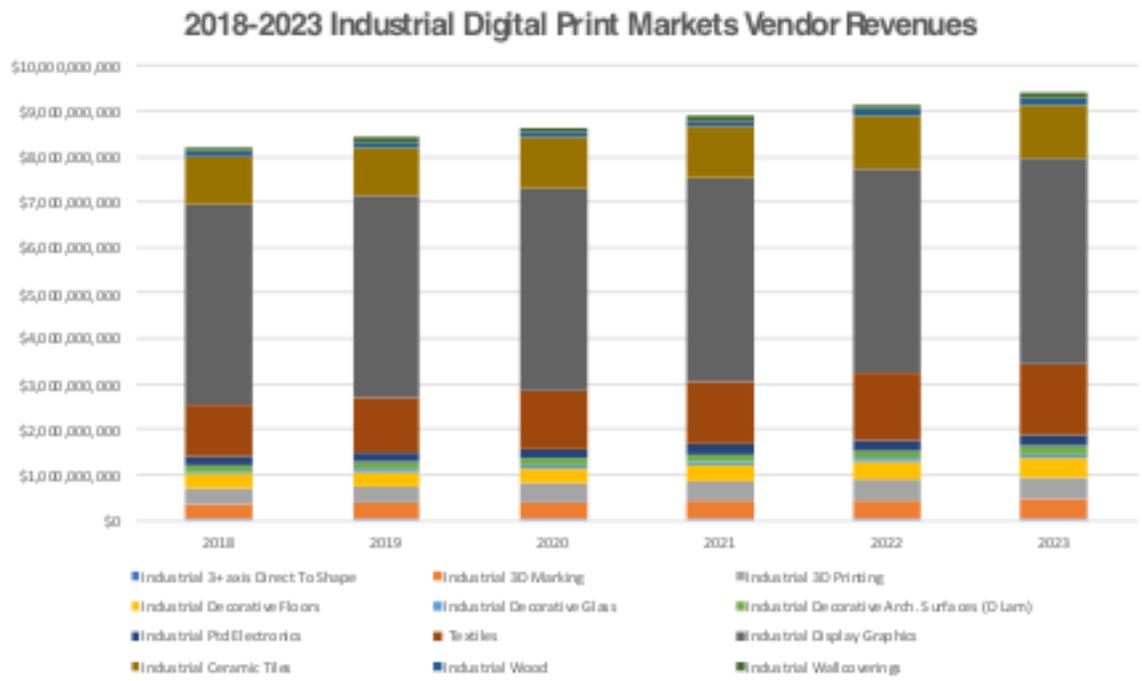
### Size of Digital Industrial Printed Market by Sector





In the following statistics we represent the size of the market for digital-printed industrial goods at the retail price level for sales of printed items to final users and also in terms of area output in square meters. All numbers are global for 2018. As with analog, we omit square meter numbers for 3+Axis 3D printing, 3D marking, 3D inkjet manufacturing and printed electronics, as these markets are not capable of measurement by square meters of area of print.

The following chart shows vendor revenues (Hardware and Inks) for digital industrial markets projected out five years:



These are the sectoral annual projections for vendor revenue of digital industrial printed goods together with the growth rates we have assumed based on research for each sector:

| Industrial Digital Print Markets Vendor Revenues HW + Ink |                 |                 |                 |                 |                 |                 |       |
|---|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-------|
|   | 2018            | 2019            | 2020            | 2021            | 2022            | 2023            | comp  |
| Industrial 3+ axis Direct To Shape                        | \$37,490,000    | \$40,071,500    | \$42,876,505    | \$45,877,800    | \$49,089,311    | \$52,525,962    | 7.00% |
| Industrial 3D Marking                                     | \$318,000,000   | \$337,080,000   | \$357,304,800   | \$379,743,088   | \$404,467,673   | \$432,536,784   | 6.00% |
| Industrial 3D Printing                                    | \$367,500,000   | \$385,875,000   | \$405,368,750   | \$425,437,188   | \$446,698,547   | \$469,038,474   | 5.00% |
| Industrial Decorative Floors                              | \$287,280,000   | \$310,262,400   | \$335,083,292   | \$361,890,062   | \$390,841,268   | \$422,108,370   | 8.00% |
| Industrial Decorative Glass                               | \$51,675,000    | \$54,775,500    | \$58,062,030    | \$61,545,752    | \$65,238,497    | \$69,152,407    | 6.00% |
| Industrial Decorative Arch. Surfaces (D Lams)             | \$142,240,000   | \$152,271,700   | \$162,980,719   | \$174,335,889   | \$186,539,380   | \$199,597,187   | 7.00% |
| Industrial Ptd Electronics                                | \$206,000,000   | \$213,180,000   | \$220,345,400   | \$227,510,762   | \$234,854,815   | \$238,880,459   | 3.00% |
| Textiles  | \$1,112,800,000 | \$1,190,696,000 | \$1,278,084,720 | \$1,363,227,820 | \$1,458,653,800 | \$1,560,739,966 | 7.00% |
| Industrial Display Graphics                               | \$4,422,000,000 | \$4,484,110,000 | \$4,466,380,550 | \$4,488,662,208 | \$4,511,105,514 | \$4,533,684,061 | 0.50% |
| Industrial Ceramic Tiles                                  | \$1,060,800,000 | \$1,082,016,000 | \$1,103,666,320 | \$1,125,729,446 | \$1,148,244,035 | \$1,171,208,916 | 2.00% |
| Industrial Wood   | \$119,780,000   | \$126,966,800   | \$134,388,808   | \$142,659,896   | \$151,219,490   | \$160,238,660   | 6.00% |
| Industrial Wall Coverings                                 | \$75,600,000    | \$81,648,000    | \$88,179,840    | \$95,234,227    | \$102,852,965   | \$111,081,203   | 8.00% |
|   | \$8,201,196,000 | \$8,417,952,900 | \$8,646,767,834 | \$8,888,435,206 | \$9,143,805,296 | \$9,412,787,129 | 2.80% |

A further statistic of some importance for digital industrial markets is the approximate number of installed systems worldwide which we represent below:

|   | <b>2018</b>    |
|---|----------------|
| <b>Industrial 3+ axis Direct To Shape</b>           | 128            |
| <b>Industrial 3D Marking</b>                        | 12,720         |
| <b>Industrial 3D Printing</b>                       | 3,990          |
| <b>Industrial Decorative Floors</b>                 | 54             |
| <b>Industrial Decorative Glass</b>                  | 159            |
| <b>Industrial Decorative Arch. Surfaces (D Lam)</b> | 27             |
| <b>Industrial Ptd Electronics</b>                   | 258            |
| <b>Textiles</b>                                     | 32,100         |
| <b>Industrial Display Graphics</b>                  | 287,430        |
| <b>Industrial Ceramic Tiles</b>                     | 4,335          |
| <b>Industrial Wood</b>                              | 53             |
| <b>Industrial Wallcoverings</b>                     | 702            |
|   | <b>341,956</b> |

## **Review of Sectoral Status in industrial Digital Print**

Immediately below we summarize the development status of the markets we define as industrial.

### **3+ axis Direct-To-Shape**

#### **What we said ~1 year ago:**

This market accelerated significantly in the last two years having started with a couple of direct bottle printing systems (KHS, Kronen) and now spawning over 20 products mostly targeting cylindrical packaging like cans, but including true 3-D systems like Heidelberg's Omnifire and Xerox's direct to object printer. It is exciting, but very specialized for now allowing customers very short run printing around promotional products and early customized manufactured products like car interiors (Omnifire). The sector has not yet progressed to a production scale with systems priced around the \$100-200K and \$500K+ levels. An argument has been put forward for direct print in place of labels in the cause of lower costs and less waste, but it remains a debate.

#### **What has changed:**

This market is progressing at a relatively modest pace, and more in Europe than in North America. The most interesting work is still related to bottles, containers and beverages for consumer markets where projects take place a lot behind closed doors. But there are major persisting technical issues of integration to manufacturing industries with extreme low-cost economics, as well as lack of clarity within existing industries of how and to what extent to implement digital print. There is no clear vision of a major opportunity within the existing container-processing industry.

## 3D Marking & Promotional Goods Printing

### What we said ~1 year ago:

This is a market for sub-\$30K systems which has been developing to a quarter billion dollar size in vendor revenues over the last 3-5 years using UVIJ printing systems with deep platens able to accept basically flat manufactured products (think iPhone covers) and print a little over beveled edges too. This has proved a popular market for Mimaki, Roland, Mutoh and others, and it addresses the very lucrative promotional goods market. The real long-term target is however the market for marking virtually all manufactured products in some way or another. That market is split by verticals and is mostly served by semi-captive product decorators as well as local screen/pad printers and in-house decoration shops. The argument for IJ is strong as pad and screen are essentially manual batch print techniques unable to vary images or really apply sophisticated color.

### What has changed:

This market progresses at a strong pace and has taken initiatives in recent times beyond 2D printing of 3D (in other words, fully manufactured objects are meant here even if only a flat surface and some beveling are actually digitally printed). We have seen cylindrical print within the promotional goods industry as a direct challenge to screen print which cannot achieve full color images and is not automated, where there is a clear vision of added value and customized market development. However some of the early implementations have been plagued with problems related to poor design, manufacturing and implementation.

## 3D Printing

### What we said ~1 year ago:

3D printing specifically with Inkjet has become more mainstream in the last 3-4 years with most of the emphasis going to powderbed systems often used for making custom molds as well some activity with functional UV-curable materials by direct object DOD Inkjet print. HP with Multijet Fusion is betting a lot on industrial-scale powderbed systems for true mid-level production competitive to and much more flexible than vacuum forming technology. There is every reason to expect this to take IJ in 3D printing to a new level given the investments HP have made, so that this sector will lend more and more credibility to Inkjet as a valid component for manufacturing.

### What has changed:

Progress is made along the lines of our what we said a year ago. But Inkjet is still a specialty subset of the overall 3D manufacturing market. HP, as the leading and largest vendor and implementer of Inkjet powderbed systems, have adapted the technology to manufacture of metal parts using metal powders with subsequent kiln annealing. But statistics are not forthcoming, suggesting a very long development and market insertion cycle for this technology.

## Decorative Floors

### What we said ~1 year ago:

Floors technically include ceramic tiles, carpets, wood and laminates, but these are often viewed as separate markets in their own right. That makes it hard to agree on what the core market is. Carpets are digitally printed to a modest extent and of course almost all ceramic tiles are digitally printed. There is also a small, specialized market for printing wood which goes to some floor applications. Finally there are new vinyl flooring types, which have succeeded in re-asserting themselves up the value chain as high quality products and these are beginning also to be digitally printed

chain as high quality products, and these are beginning also to be digitally printed, though not always with dedicated print systems. On top of all that complexity print on floors has traditionally been seen in pre-digital days as a low end product for those who did not want to spend on real wood or stone. So digital flooring printing exists in more than one form but in each case in a specialized way in small amounts. There is not a single or dominant digital flooring dynamic yet.

#### **What has changed:**

We see only modest new activity in this sector in US/EU. We do believe that digital print of vinyl flooring is growing and especially in China. Once again however we suspect (but do not know) that the best vector forward for this market may not, as so often, be through the existing industry. But all markets around the construction market have relatively closed channels making it very hard for a parallel digital market to gain traction unless it is an initiative from within the existing industry to create such a new channel direct say to retailers and micro-brand owners.

### **Decorative Glass**

#### **What we said ~1 year ago:**

Flat glass as a substrate is a truly specialized surface. The point of flat glass is of course principally and often to be transparent. Flat glass does get treated in different ways however especially today as a means of controlling ambient environments. Many of these treatments are applied during manufacture and are not printing or patterning processes. There are however types of glass that need patterning like auto glass and like some decorative glass used in architecture. An Israeli company called Dip-Tech has specialized in producing very large-scale Inkjet flatbed systems using frit inks (ceramic pigments which become permanently part of the glass on firing). These are built in particular to be able to handle the enormous weight of glass panels. There is also some printing of glass surfaces with UV ink on flatbed systems. But there is also decoration on glass that comes indirectly from static film, which is separately digitally printed and applied in application. This is a truly specialist market.

#### **What has changed:**

Small specialist market with no strategic change in direction

### **Decorative Architectural Surfaces**

#### **What we said ~1 year ago:**

What is usually meant by this term is laminate substrates which are essentially multiple layers of paper and sometimes other substrates impregnated with resin and formed into a solid substrate under high heat and pressure. Print is often applied to a final paper surface under the last clear resin overlay of the substrate. There have been attempts to bring digital print to this market for 20 years and the result today is that about ½ of one percent of this not very big market (ca. 9-10B M2 globally) is today printed digitally mostly by flatbed UV and aqueous systems which are sometimes not purpose built. While arguments have been cogently made over the years for lifestyle type environment demand driving this market (think customized fields of flowers on surfaces in a hospital) the industry has not really connected strategically with the potential for reasons which are not fully clear. Perhaps the traditionally-perceived low value nature of laminates as a user product is a barrier here. For the US we can also say that the laminates industry is additionally said to be to some serious extent structurally behind the European industry as well.

#### **What has changed:**

We are disappointed to register little digital progress on the part of the major (mostly German) laminate gravure printers all of whom have some kind of production digital initiative involving large scale and very specialized single pass AQIJ systems in

cooperation with such firms as KBA and Padaluma. Against that an industry-insider machinery manufacturer like Hymmen has made significant progress in EU by surface printing, for one thing, of laminates which are sold direct to brands and users thus substantially by-passing the gravure channel.

## Printed Electronics

### What we said ~1 year ago:

In the electronics industry components are made by batch manufacturing (think of LCD panels being made on single super-large glass substrate units and cut down to consumer size in a repetitive process – same for semiconductors. Batch manufacturing limits the lower minimum cost level of manufacturing. The dream is to come up with a Roll-To-Roll manufacturing technique for functional components. This has created interest over the years in using the patterning and chemicals applications techniques of the print industry (certainly not just *digital* print, by the way). But the true use of print techniques beyond the already established and relatively crude screen printing of circuit boards has not taken off. This has to do with the paucity of room temperature chemistries (necessary for print processes as we know them) with the appropriate functionality (like speed of charge transmission for example) as much as anything. There are also limits in taking print from macro- to nano-scale. Some work continues, but true electronics patterning is still at an early stage. Nor is this market to be confused with *coating* of active chemistries like photoluminescents or organic photovoltaics for example.

### What has changed:

Little has changed apart from the persistence of activity indirectly state-funded especially in EU in attempting to develop Inkjet- and Aerosol- deposition systems. Such systems have what you could call a research market, but it is not at this time in terms of functional electronics a real commercial market. A brighter horizon for digital deposition is represented by the spread of OLED (electroluminescent chemistry) technology in consumer devices and now the first televisions (liquid room-temperature chemistry which is self-luminescent). This is a long-term replacement of LCD displays having greater functionality and being far simpler as systems in engineering terms. However at this time the cost is still relatively high. Inkjet is highly suited to this technology as a means of deposition, and is being implemented now. Inkjet in this case represents an initiative by the mainstream electronics industries involved as a full integration to existing manufacturing plant. We must also mention that the profile in Europe of better-established integrators for example like Meyer Burger (PixDro, Jet-X) , PadLuma & Ceradrop (MGI) who have specific printed electronics focus is higher than in the past.

## Textiles

### What we said ~1 year ago:

Textiles is a huge digital print success story. It is a two-fold success succeeding at the low end with dye sublimation technology for both fashion and soft signage, and at the high end with reactive dye technology for production R2R printing. This has been driven by the excellent functionality of soft signage as a light and easily transported and brilliant form of signage. But even more important, in the apparel world at high end and low end digital answers the needs of a demand industry driven by very fast cycles, social media-driven fashion and fragmentation of markets where short runs and fast supply and change are at a great premium. This is a core benefit of digital print (though digital is not facing a static competitor in screen print either). This market is getting close to a steep commercial development curve, though it is also dependent on major changes in brand- and retail-driven supply chains out of its control.

### **What has changed:**

Dye sublimation technology in low-end formats has made significant progress in the last year in high fashion apparel markets due to the lack of available large-scale print manufacturing near to the fast fashion markets of US and EU. In some ways low end Dye Sub is a parallel channel to brand owners and retailers in support of the specific market Fast Fashion sub-sector. Meanwhile high-scale digital print systems vendors are turning more now to single pass as a real economic substitute for rotary screen in Asian manufacturing markets. That is economically potentially possible partly because digital ink prices in this segment are so low where for so long the ink market has been open to all suppliers. On top of this there are rumors of the imminent appearance of a major new vendor in textile digital printing. Demand is good in this segment, but economic conditions for suppliers are worrying to say the least.

## **Display Graphics**

### **What we said ~1 year ago:**

Display Graphics is a 20+ year old market which from a vendor perspective feels very mature as a function of the brutal competition in this sector. But despite that (lower hardware and ink prices) in demand terms the market is still growing healthily. Wide Format Inkjet Graphics has many applications, but the core driver is the ability to provide local retailers with POP graphics. That is a function in support of sales of consumer goods that can be called strategic to the consumer economy. The value of printed and converted output from this industry globally is over \$40B. This market has also given rise to systems, which serve some of the other markets discussed in this review such as direct to shape and textiles. Those new markets represent by now a further 30% of value beyond the original WFG market.

### **What has changed:**

Soft signage, for one thing, has now reached a share of WFG of near 25% of physical output within the last year. This is mostly dye sublimation technology. In addition wide format has become more and more a leading vector in channel convergence, which refers to individual channels of the past converging to being multi-technology and market channels. WFG has been an early vehicle of this shift among commercial printers to name perhaps the largest print provider channel. This is reflected in the initiative of the SGIA trade organization to transform their trade show into the new Printing United show in 2019. This could trend could generate a platform for developing large sheet-fed digital systems derived from WFG technology for use in multiple applications for micro-runs. That could be competition for EP technology down the road.

## **Ceramic Tiles**

### **What we said ~1 year ago:**

We like to say that the rule of production digital markets is that they coexist alongside analog print doing different things and often not affecting analog markets directly (Wide Format Graphics is a great example). This is the market which is the living disproof of and exception to that theory. The foregoing flexo-like print process for ceramic tiles was clumsy, slow, very expensive and changing its patterns could even cause manufacturing problems in firing finished tiles. This market is also exceptional in that most of the work to develop printers which could use ceramic pigments (theoretically a difficult chemistry for Inkjet) was undertaken by the analog existing industry and never really was of origin within the true digital print community. The result is that we are getting towards around 80% market penetration and substitution by digital after only around 12 years or so. True market maturity reigns

### **What has changed:**

This market was and remains almost mature and fully digitally colonized. A good part of the Chinese market (easily the world's largest) remains in the hands of Chinese systems suppliers however. Also, the initiative to take Inkjet into previously curtain- or roller-applied glaze (even full cover glaze) has made progress significantly based on the value proposition of reduced waste and more accurately metered application allowing of varying effects.

## **Wood**

### **What we said ~1 year ago:**

Wood is a very specialized market and can take many applied forms, but the two important sectors you hear a lot about are flooring and doors. It is not a large market and has been served well with digital print by a Spanish company in particular called Barberan. Specialized means not more than hundreds of millions of square meters and perhaps a market for well under 100 flatbed systems.

### **What has changed:**

No substantial change in digital print of wood

## **Wallcoverings**

### **What we said ~1 year ago:**

Wallcoverings is a good example in most of the world of an established and conservative market. In fact wallcoverings usage varies greatly around the world based on strong cultural factors. This is another market where wholehearted efforts have been made for years to get into the mainstream wallcoverings markets – in other words, to get into the existing supply chain. Wallcoverings that are digitally printed are in fact nowadays quite popular and growing in their usage. It is a larger specialized market with considerable consumer potential. But this success – also to a good extent due to the availability of a waterproof and odorless chemistry in the form of HP's Latex – has been due to the opening of a separate and parallel retail and converter channel not usually within the traditional wallcoverings supply chain. Furthermore something called wall graphics came along using removable adhesive and cut shapes, and leveraging the ability of digital to print small quantities in varying forms frequently.

### **What has changed:**

HP's Latex initiatives in wallcoverings have yielded what is becoming a generically new market for custom wallcoverings involving for example custom print of individual rooms for boutique hotels, or theme-printed wall environments around sports leagues. While such initiatives have taken time to root themselves they have now taken root and are largely associated with a single vendor. This is the kind of market which constitutes a component of a market in future of diverse and high value specialty print products. This is parallel specialty market development in one of its best implementations even if still quite small.

